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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/729,153	12/05/2003	Aref Chowdhury	7-10-2	1023

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Docket Administrator (Room 3J-219)  
Lucent Technologies Inc.  
101 Crawfords Corner Road  
Holmdel, NJ 07733-3030

EXAMINER

JEAN BART, RALPH

ART UNIT	PAPER NUMBER
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2613

DATE MAILED: 12/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/729,153

Applicant(s)

CHOWDHURY ET AL.

Examiner

Ralph Jean-Bart

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 23 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17-20 is/are allowed.
- 6) ☒ Claim(s) 1-8 and 10-16 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 May 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **Drawing Objections**

Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 – 8, 10-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over McNicol (pub. No: US 2002/0131160) in view of Lu et al (US 6,832,051).

With respect to claim 1 and 10 McNicol teaches transporting digital optical data signals

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at a selected bit rate and a selected wavelength over a sequence of transmission spans including 70 percent or more of the spans of the long-haul all-optical communication path (**see abstract; paragraph 0007; paragraph 0029; it should be noted that figure 1 shows a sequence of 100% of transmission span**), each span being configured to have one or more local maximum optical power points at the selected wavelength on a transmission fiber thereof (**see figure 2D, for a wavelength of about 1585 nm the output power is about 1.4dBm, and , further paragraph 0084 discusses that the Raman pump powers were adjusted to obtain a flat output power over two span which the Examiner interprets as a maximum optical power point**).

Wherein for each span, a primary local maximum power point at the selected wavelength is the one of the local maximum power points nearest to a signal input in the associated one of the fibers (**figure 2A shows a Raman Pump at each fiber, wherein paragraph 0075 discusses a distributed Raman amplification, where the maximum achievable Raman gain may be limited by a maximum power; since each span of figure 2A has a Raman pump, therefore a primary local maximum is formed at each span.**)

McNicol fails to teach the transporting causing a cumulative dispersion of each transported optical signal to evolve such that residual dispersions per span over some ones of the spans are positive and such that residual dispersions per span over other ones of the spans are negative; at the primary local maximum power point of each span of the sequence, magnitudes of cumulative dispersions of the digital optical data

signals in pico seconds per nanometer are less than 32,000 times the inverse of the bit rate in giga bits per second.

However, Lu teaches the transporting causing a cumulative dispersion of each transported optical signal to evolve such that residual dispersions per span over some ones of the spans are positive and such that residual dispersions per span over other ones of the spans are negative (see figure 16 where the residual dispersion is positive at point G and negative at point F'; column 9 lines 30-40); at the primary local maximum power point of each span of the sequence, magnitudes of cumulative dispersions of the digital optical data signals in pico seconds per nanometer are less than 32,000 times the inverse of the bit rate in giga bits per second (**figure 10 shows a Graph comparing system penalty in dBQ with respect to cumulative dispersion, as an example when the penalty is 1.8 (dBQ) for channel 102, the dispersion compensation is 125 ps/nm which is "less than 32,000 times the inverse of the bit rate in giga bits per second" because  $32,000 \times 1/40\text{Gb/s}$  is about 800 ps/nm and is bigger than 125ps/nm**).

Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to have modified the Dispersion management of McNicol by incorporating a transporting which causes a cumulative dispersion of each transported optical signal to evolve such that residual dispersions per span over some ones of the spans are positive and such that residual dispersions per span over other ones of the spans are negative; and,

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further at the primary local maximum power point of each span of the sequence, magnitudes of cumulative dispersions of the digital optical data signals in pico seconds per nanometer are less than 32,000 times the inverse of the bit rate in giga bits per second in order to provide an improved dispersion managed link for RZ WDM optical system, and , further, to minimize the maximum combined effect of self phase modulation , and intersymbol interference as taught by Lu (see Lu column 1 line 65-column 2 line 5).

With respect to claim 2 and 15, all the limitations have been discussed in claims 1 and 10 above. McNicol fails to teach wherein each transmission fiber is a non-hybrid optical fiber and each transmission span of the sequence includes a dispersion compensator cascaded with the transmission fiber of the same span.

However, Lu teaches wherein each transmission fiber is a non-hybrid optical fiber and each transmission span of the sequence includes a dispersion compensator cascaded with the transmission fiber of the same span (**see figure 1, wherein elements are placed in sequence (cascaded); column 2 lines 5-16**).

Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to have modified the Dispersion management of McNicol by incorporating a non-hybrid optical fiber whereby each transmission span of the sequence includes a dispersion

compensator cascaded with the transmission fiber of the same span in order to reduce the effect of intersymbol interference.

With respect to claims 3 and 16, McNicol teaches the transporting comprises transporting optical pulses in a pseudo-linear transmission regime (it should be noted, in order to be in a pseudo-linear transmission regime, the bit rate is 10Gb/s or more and has dispersion of 2ps/nm or more, and McNicol teaches a single mode fiber of bit rate of 40Gb/s, see paragraph 007 and a positive dispersion of 2ps/nm/km see paragraph 0017, and therefore the system is a pseudo linear regime).

With respect to claim 4, Lu teaches wherein at the primary local maximum power point at the wavelength of each span of the sequence, cumulative dispersions of the digital optical data signals in pico seconds per nanometer are less than 16,000 times the inverse of the bit rate in giga bits per second (see claims 1 and 10 above).

With respect to claim 5, McNicol teaches the selected bit rate is 20 Gb/s or higher (see paragraph 0007); a portion of the transmission fibers have lengths of 80 kilometers or more (see paragraph 0020).

With respect to claim 6, Lehmann teaches the digital optical data signals are optical pulses (see column 4 lines 33-43).

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With respect to claims 7 and 11, all the limitations of these claims have been discussed in claim 3. McNicol fails to teach the dispersion map is one of a doubly periodic map and a map having a non-definite periodicity.

However, Lu teaches the dispersion map is one of a doubly periodic map and a map having a non-definite periodicity (**see figure 17 which the examiner interprets as a non-definite periodicity or is doubly periodic because the graph shows a dispersion compensation map for different channel which has a positive and negative dispersion**).

With respect to claim 12, McNicol teaches wherein the transmission single mode optical fibers have positive dispersion (see paragraph 0008).

With respect to claims 8 and 13, and 14 McNicol teaches a combined length of transmission fibers of the optical communication path is 2000 kilometers or more (see abstract).

### **Statement of Reasons for Allowance**

#### **Examiner Statement of Reason for Allowance.**

3. Claims 17-20 are allowed.

Claim 17 is allowable, because the prior art of record fails to teach wherein the path is configured to produce in each fiber one or more local maximum optical power



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operation a time-averaged optical power at the wavelength is at least 0.2 times the largest value along the same fiber for the time-averaged optical power at the wavelength, a primary one of the segments being such that an integral of a time-averaged optical power at the wavelength along the length of the primary one of the segments is greater than or equal to an integral of the optical power at the wavelength along the length of any other one of the segments for the same fiber.

Since, no teaching can be found of obtaining the path is configured to produce in each fiber one or more local maximum optical power points at the wavelength, each fiber having one or more segments where during operation a time-averaged optical power at the wavelength is at least 0.2 times the largest value along the same fiber for the time-averaged optical power at the wavelength, a primary one of the segments being such that an integral of a time-averaged optical power at the wavelength along the length of the primary one of the segments is greater than or equal to an integral of the optical power at the wavelength along the length of any other one of the segments for the same fiber. Since independent claim 17 contains the claim language that is allowable as indicated in claim 17-20. Claims 1—20 are therefore novel and non-obvious.

**Objection**

4. Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ralph Jean-Bart whose telephone number is (571)270-1017. The examiner can normally be reached on Mon-Thurs 7:30-5:00PM; Fri 7:30-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

  
KENNETH VANDERPUYE  
SUPERVISORY PATENT EXAMINER

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RSB  
Ralph Jean-Bart

11/21/2006